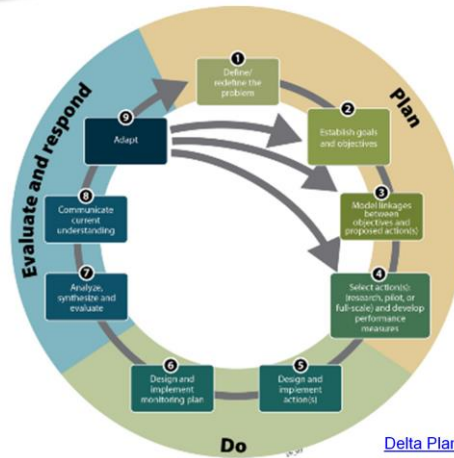


# Delta Plan Adaptive Management Framework



Covered actions must include an adaptive management plan consistent with the 3-phase 9-step AM framework outlined in the Delta Plan. This is very well described in the Delta Plan, under the delta plan policies, appendix 1B of the Delta Plan.: <http://deltacouncil.ca.gov/docs/appendix-1b>

We are using this nine-step process in evaluating the usefulness of AM plans in proposed covered actions.

# Delta Plan Adaptive Management Framework



- 1. Define/Redefine the problem
- 2. Establish goals and objectives
- 3. Model linkages between project objectives and proposed actions
- 4. Select actions and develop performance measures
- 5. Design and implement actions
- 6. Design and implement monitoring plan
- 7. Analyze, synthesize and evaluate
- 8. Communicate
- 9. Adapt

These are the steps from the nine step process. I will go over few of them to highlight key components.

Your project proposal should already include a definition of the problem as well as goals and objectives for your project.

The project objectives should include specific, quantitative outcomes that could be used as performance measures.

# Delta Plan Adaptive Management Framework



- 1. Define/Redefine the problem
- 2. Establish goals and objectives
- 3. Model linkages between project objectives and proposed actions**
- 4. Select actions and develop performance measures
- 5. Design and implement actions
- 6. Design and implement monitoring plan
- 7. Analyze, synthesize and evaluate
- 8. Communicate
- 9. Adapt

The Step 3 is an important step in the AM process. This is where you document the best available science underlying your project, identifying cause and effect relationships showing why implementing your proposed project will achieve your goals and objectives.

Use models – conceptual, statistical, physical, or other – to describe the why (the project actions are expected to result in meeting the objectives). This can be simple or elaborate. The model will summarize the current understanding of these connections. This is where best available science comes in. Best available science is documented using references of published literature.

If there are uncertainties, models can provide a road map for identifying those issues, and developing statements as hypotheses that describe the expected outcome of an action.

# Delta Plan Adaptive Management Framework



- 1. Define/Redefine the problem
- 2. Establish goals and objectives
- 3. Model linkages between project objectives and proposed actions
- 4. Select actions (research, pilot, or full-scale) and develop performance measures**
- 5. Design and implement actions
- 6. Design and implement monitoring plan
- 7. Analyze, synthesize and evaluate
- 8. Communicate
- 9. Adapt

 DELTA STEWARDSHIP COUNCIL

In step #4, consider what is known about the science before deciding whether to set the project as research, pilot or a full-scale.

This solicitation opportunity is probably most relevant to full-scale implementation projects. So I **will** focus on the performance measures.

Derive performance measures from goals and objectives. Base the performance measures on the conceptual model. Select those performance measures that help address the status and trends of progress toward achieving the projects goals and objectives. The project performance measures should include:

a brief rationale for each performance measure,  
metrics and unit,  
method for analysis,  
baseline and reference conditions,  
expected outcomes,  
timeline for evaluation

The development of performance measures should be informed by the best available science.

A monitoring plan should be designed so that the information collected supports performance measure analysis and reporting.

# Delta Plan Adaptive Management Framework



- 1. Define/Redefine the problem
- 2. Establish goals and objectives
- 3. Model linkages between project objectives and proposed actions
- 4. Select actions and develop performance measures
- 5. Design and implement actions**
- 6. Design and implement monitoring plan**
- 7. Analyze, synthesize and evaluate
- 8. Communicate
- 9. Adapt

 DELTA STEWARDSHIP COUNCIL

Steps 5 and 6 go together. A monitoring plan is an important component of the adaptive management process. A well-designed monitoring plan includes:

Compliance monitoring (required by permits)

Performance monitoring with pre-project monitoring (measuring achievement of targets linked to project objectives)

Mechanistic monitoring to reduce scientific uncertainty by testing the understanding of linkages between project goals and objectives and expected project results/outcomes

Connections to system-level monitoring, such as relevant long term monitoring programs

For pre-project monitoring, include documentation of initial conditions so that a baseline is established. Baseline data includes characterization of natural variation observed in the project area over space and time. For many ecological and hydrological variables, an extensive set of baseline data is available because of the efforts of the Interagency Ecological Program and repositories of information such as those available from the U.S. Geological Survey and the California Department of Water Resources.

A well-designed monitoring plan includes a **data management plan** that describes how project data will be archive after project ends and how to access those project data.

# Delta Plan Adaptive Management Framework



- 1. Define/Redefine the problem
- 2. Establish goals and objectives
- 3. Model linkages between project objectives and proposed actions
- 4. Select actions and develop performance measures
- 5. Design and implement actions
- 6. Design and implement monitoring plan
- 7. Analyze, synthesize and evaluate**
- 8. Communicate
- 9. Adapt

Describe steps for analysis, synthesis and evaluation of data gathered through the project monitoring. Analysis and synthesis should focus on how conditions have changed as a result of implementing project actions.

In designing this step, set it up to answer these questions:

Are you achieving project goals and objectives?

Are you reducing uncertainties?

# Delta Plan Adaptive Management Framework



- 1. Define/Redefine the problem
- 2. Establish goals and objectives
- 3. Model linkages between project objectives and proposed actions
- 4. Select actions and develop performance measures
- 5. Design and implement actions
- 6. Design and implement monitoring plan
- 7. Analyze, synthesize and evaluate
- 8. Communicate**
- 9. Adapt

The AM plan identifies how project information will be disseminated. Communication should be ongoing and occur at appropriate intervals. The information should be disseminated to those directly involved in decision making for the adaptive management process for the project and to those interested in the outcome of the project, including any new scientific information that could inform future restoration projects.



# Delta Plan Adaptive Management Framework



- 1. Define/Redefine the problem
- 2. Establish goals and objectives
- 3. Model linkages between project objectives and proposed actions
- 4. Select actions and develop performance measures
- 5. Design and implement actions
- 6. Design and implement monitoring plan
- 7. Analyze, synthesize and evaluate
- 8. Communicate
- 9. Adapt**

 DELTA STEWARDSHIP COUNCIL

The plan should describe adaptation strategies to changes in the current understanding and changes in current conditions.

Decisions could be:

Continue what you are doing

Tweak your problem statement or objective

Remove objective that is not realistic

Refocus management on more promising objectives

Update the conceptual models underlying your project approach

Make a change to your current project

This step does not automatically mean that you will have to change project infrastructure.

## Use Best Available Science

- Document scientific basis supporting your proposed project
- Include scientific literature relevant to the problem
- Cite papers on both sides of scientific uncertainties
- See Table 1A-1 in [Appendix 1A](#) for specific attributes of Best Available Science

Document use of science in your project proposal.

Include scientific literature relevant to your problem (relevance)

Sometimes the most recent and relevant information is not yet peer reviewed, that is fine (timeliness)



Peer reviewed, published literature is best, followed by gray literature, then agency reports peer reviewed, agency reports not peer reviewed, then performance reviews, etc. (peer review)

Clearly identify limitations and methods used (transparency and openness)




Cite papers on both sides of scientific uncertainties (inclusiveness)

# Resources

## **Delta Plan – General Policy 1 (GP1)**

-  Best Available Science - [Appendix 1A](#)
-  Adaptive Management - [Appendix 1B](#)

## **Delta Science Program Adaptive Management Liaisons**

-  Suisun Marsh Region: Maggie Christman, [maggie.christman@deltacouncil.ca.gov](mailto:maggie.christman@deltacouncil.ca.gov)
-  West and Central Delta, Cache Slough: Karen Kayfetz, [karen.kayfetz@deltacouncil.ca.gov](mailto:karen.kayfetz@deltacouncil.ca.gov)
-  East and North Delta, Yolo Bypass: Martina Koller, [martina.koller@deltacouncil.ca.gov](mailto:martina.koller@deltacouncil.ca.gov)

On the DSC certification of consistency website are helpful resources. The recent Tule Red Restoration Project covered action is a good examples of a well developed AM plan.

The Science Program has staff to help and provide advice on adaptive management for habitat restoration and also for water supply reliability.